Amendments to the Specification

Page 59, after line 18, please insert the following text:

The present invention has a feature in that the main layer 18a or 18b and the heterospike relaxation layer 18c constituting the semiconductor distributed Bragg reflector of FIG. 3, have a carrier density in the range from $5 \times 10^{17} cm^{-3}$ to $2 \times 10^{18} cm^{-3}$, the heterospike relaxation layer 18c has a thickness in the range from 5nm to 40nm, and the average change rate of Al composition in the region II (see FIG. 4) is in the range from $0.02 nm^{-1}$ to $0.15 nm^{-1}$. Here, the Al compositional gradient in the region I is defined as "Al compositional gradient = {variation (0-1) of Al content in the region I)/dI". By choosing each parameter of the heterospike buffer layer 18c that includes the distributed Bragg reflector to the foregoing range, reduction of resistance is achieved easily and effectively.

Table 12 below shows the Al composition gradient that provides minimum of the electric resistance and the corresponding sheet differential resistance for the case of changing the carrier density of the distributed Bragg reflector and the heterospike buffer layer 18c ($5 \times 10^{17} cm^{-3}$, $2 \times 10^{18} cm^{-3}$) and the thickness of the heterospike buffer layer 12 in the structure of FIG. 9, together with the percentage of the electric resistance decrease in comparison with the case in which a simple linear compositional gradient is used for the heterospike buffer layer (the structure of FIG. 5).

Table 12

Heterospike buffer layer thickness	5×10^{17} [cm^{-3}] carrier density	2×10^{18} [cm^{-3}] carrier density
5 [nm]	0.16 [nm^{-1}]/8.4×10^{-6} [Ω cm^2]/83%	0.16/4.5×10^{-8} [Ω cm^2]/90%
40 [nm]	0.02 [nm^{-1}]/2.1×10^{-9}[Ω cn^2]/91%	. . .

In view of increase of electrical resistance with decrease of the carrier density, the value of $5 \times 10^{17} cm^{-3}$ is chosen as the actually allowable lower limit. Further, a value of $2 \times 10^{18} cm^{-3}$ is chosen as the allowable upper limit in view of conspicuous optical absorption

particularly in the case of a p-type semiconductor.

In the case the thickness of the heterospike buffer layer 12 is increased, a remarkable decrease of resistance is achieved. On the other hand, such a decrease of the thickness of the heterospike buffer layer 12 is not preferable in view of decrease of reflectance of the distributed Bragg reflector. From the viewpoint of reflectance, it is believed that the value of 40nm or less is important for the practical thickness of the heterospike buffer layer.

In the case the thickness is too small, the desired resistance decrease is not attained. Thus, it is believed that the value of 5nm or more is important for the thickness of the heterospike buffer layer 12 for realizing sufficient resistance reduction effect.

As compared with the case of the simple compositional gradation layer in which the Al content is changed linearly from the small-bandgap layer to the large bandgap layer constituting the main layers of the distributed Bragg reflector, the foregoing construction can achieve further reduction of the resistance. Within the foregoing range, the differential sheet resistance is decreased to about 75% ($1.2 \times 10^{-9} \Omega\ cm^2$ in terms of differential sheet resistance) in the embodiment of claim 3, and thus a significant effect is achieved.

Thus, the present embodiment can reduce the resistance further as compared with the case of using the linear compositional gradient in the heterospike buffer layer 18c of the same thickness. In the case of achieving the same resistance value, on the other hand, the present embodiment allows the use of reduced thickness for the necessary heterospike buffer layer 18c. Thus, adversary effect on the optical properties such as reflectance is minimized.

Thus, it becomes possible to obtain a distributed Bragg reflector excellent in terms of electric properties and optical properties, by choosing the structure of the distributed Bragg reflector and heterospike buffer layer as set forth in the claims.